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ABSTRACT

This document reports on dissemination lectures that inform the educational research community about the Program Evaluation and Review Technique (PERT). In the first two chapters, the background leading to the dissemination lectures, the procedures used by the project staff to accomplish dissemination objectives, and the methodological procedures involved in planning and performing the lectures are reported. The process by which the lecture content was cumulated and the contents themselves are described in Chapter III. The last two chapters present the results of the various evaluation instruments, and a discussion of the results, conclusions, and recommendations. Two appendixes provide supplementary information not incorporated in the text. A related document is ED 010 372 (Volume II of this study), which comprises a participant followup study of the dissemination lectures. (Author)

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FINAL REPORT
Project No. E-019
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THE PERT LECTURES: A CASE STUDY IN KNOWLEDGE DISSEMINATION AND UTILIZATION

VOLUME 1: INITIAL LECTURES

August 1966

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

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The senior author of the report assumes the final responsibility for its contents.

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CHAPTER I

BACKGROUND AND PURPOSE

A generally accepted axiom among educational research and development personnel is that the successful planning and completion of a specific project depends upon a careful statement of the objectives and a detailed procedural outline. To facilitate the process of planning and executing educational research and development projects, many textbooks and related references on the techniques of research methodology have been prepared. While generally helpful in conducting the total project, such references are of limited assistance to the investigator in conducting the actual day-to-day operations of the research and/or development project.

Detailed directions for the preparation of project proposals as established by the Cooperative Research Program and the National Defense Education Act of the United States Office of Education and similar funding agencies have been of some assistance to research investigators in outlining their proposed research activities. Once such research projects are underway, however, the investigator may or may not conduct the investigation efficiently.

The development of a procedural technique which would permit project directors to determine in advance the significant events and activities relevant to the procedural phase of the investigation,

and to identify those operations whose accomplishment is critical to the successful completion of the project, would be very useful. Besides initial determination of significant events, continuous re-evaluation of project progress through such a technique might prevent delays in successful completion of the project.

At the time of this study, general techniques for educational project planning and execution as noted above are of limited availability. Other areas of scientific research and development, however, have developed techniques designed to economically and efficiently accomplish and procedural tasks of the project. The most widely known of those techniques is the Program Evaluation and Review Technique (PERT) process developed in conjunction with the Polaris missile weapons system program.

Project Purpose

The success of PERT in military and industrial management and control of research and development projects suggests the possibility that it might have similar value for educational research and development activities.

Consequently, on March 1, 1964, under Office of Education Grant #019, the author undertook a study called the PERT Project, with the following set of objectives:

A. To develop a set of working guidelines for applying PERT to a variety of educational research and development projects.

B. To construct a series of model PERT networks for common and representative types of educational research and development projects.

C. To apply the PERT technique to specific on-going projects in order to study possible improvement in project progress resulting from such application.

D. To derive a series of recommendations regarding the applicability of PERT to educational projects and to disseminate them to actual and potential project directors through publications, seminars, and workshops.

The purpose of this report is to describe the procedures that were followed in accomplishing the dissemination objective of the above study. The importance of disseminating the results of research and development efforts has increased during the last several years as a means of reducing the "theory into practice" gap that is often said to exist in the field of education. The staff of the PERT project felt that the efforts undertaken to disseminate the knowledge gained from the study should be documented and reported to the educational community as a case history in knowledge dissemination and utilization.

The total report has been divided into two separate volumes, with the first volume dealing with the initial dissemination lectures. The second volume, The PERT Lectures: A Case Study in Knowledge Dissemination and Utilization, Vol. II--Participant Follow-up Study, presents the results of a follow-up study conducted approximately six months after the initial lectures to determine the extent to which the participants utilized the information presented in the lectures. Each volume can be read as a separate and complete document.

Organization of Report

The purpose of this first chapter was to present the background leading to the dissemination lectures described in this report. The procedures used by the author and the project staff to accomplish the purpose of the dissemination lectures are reported in the balance of this report.

Chapter II describes the methodological procedures involved in planning and performing the lectures. A description of the gathering together of the actual content of the lectures as well as a succinct description of the content for each of the sessions in offered in Chapter III. Chapter IV presents the results of the various evaluation instruments, and Chapter V contains a discussion of the results along with conclusions and recommendations. Two appendices are included at the end of the report to provide supplementary information not incorporated in the text. The reader is referred to such information at appropriate places in the text.

CHAPTER II

PREPARATIONS FOR THE LECTURES

The purpose of this chapter is to describe the various procedures which were involved in planning and conducting the dissemination lectures. Specific considerations will be given to publicity and selection of sites and participants for the lectures.

Site Selection

Since the purpose of the dissemination lectures was to inform both present and potential educational researchers about the techniques and direct applications of PERT to on-going research and/or development projects, it was of prime importance that the sites for the lectures be so situated that the largest possible number of persons who would in all probability benefit from implementing PERT techniques could attend the lectures. The project proposal consequently stated that the dissemination lectures be held at universities geographically located for their accessability, numbers of actual and potential research personnel in the area, and density of research and/or development activity. A letter went out in June of 1964 to 40 major colleges and universities around the country which might serve as possible hosts for one of the twelve two-day dissemination

lectures. All of the contacted institutions indicated a willingness to serve as hosts.

The project staff developed a worksheet based upon five criteria identified in the project proposal to select the twelve most suitable sites. A copy of this worksheet has been included in Appendix A.

The first criterion was that of research activity. The project staff felt that areas where research and/or development projects were either being conducted or planned would naturally contain a proportionally higher number of persons who would benefit from implementing PERT than would areas which supported little research. Therefore, universities situated in an area where large numbers of research and/or development projects were being conducted would have been assigned a high ranking by the staff. Unfortunately, the PERT staff had neither the time nor resources to devise an accurate index for identifying the number of research and/or development projects in any given area. Consequently an easily applied index had to be employed. For this purpose, the 1963 and 1964 programs of the annual meeting of the American Educational Research Association were reviewed. A tally was made of the number of persons appearing on the program from each of the forty universities being considered and the universities were ranked accordingly.

The second criterion was that of travel accessability. The original intent was that each lecture site would function was a

regional center serving persons from neighboring states as well as persons from within the state. Universities located in a city which was served by a major airline were therefore given a high ranking.

The third criterion was researcher density within the immediate area of the proposed lecture site. Realizing that a lecture conducted within 50 miles would draw a bigger audience than one conducted 150 miles distant, the staff gave a higher ranking to universities where there was a high density of researchers in the area although they were not necessarily affiliated with the university.

A fourth criterion for selection, closely related to the third criterion, was geographical location. To assure maximum accessability to interested persons from all geographical regions of the country, it was necessary to avoid conducting the lectures at two or more universities which would draw participants from the same regional areas. The staff had several difficult choices to make between universities with nearly identical high rankings on the other criteria but which would have served the same regional area.

The fifth and final criterion was the amount of interest and initial experience with systems technique shown by persons in the area to be served by the proposed lecture site. Letters to the PERT staff by interested persons, personal contacts, direct solicitations by the staff, and announcements of where systems technique presentations have been held in the past aided in assigning a ranking to the various institutions on this criterion. It was soon

discovered, however, that a large degree of ambiguity and error was inherent in this criterion. Consequently, the fifth criterion had very little influence on the final selection.

Several highly rated institutions were eliminated as possible sites for the dissemination lectures when it was discovered that they could not host a two-day conference during the time the PERT staff had available. Since it was necessary both to assimilate and develop the content of the lectures and to develop a monograph on the applications of PERT, the staff had scheduled March and April of 1965 as the period to conduct the twelve dissemination lectures in order to realize the August 31, 1965, completion date specified in the contract.

A letter was sent to each institution announcing its selection as one of the dissemination lecture sites. The list of final lecture sites by date, location, and suggested area of coverage is presented in Table 1.

Lecture Site Coordination

Once the final selection of the lecture sites had been made and an acceptance received from each of the twelve selected universities a memorandum was sent to the Dean of the College of Education at each host institution requesting that a person be appointed who would function as a liaison between the PERT Project staff and the host university.

The liaison personnel or area coordinators had the responsibility of making publicity arrangements within the regional area, planning

Table 1 - Dates, Locations, and Areas of Coverage for Dissemination Lectures

Dates	Location	Area To Be Covered
March 1 and 2, 1965	University of California (Berkeley)	Northern California, Oregon, Washington, Northern Nevada
March 4 and 5, 1965	University of Southern California	Southern California, Arizona
March 15 and 16, 1965	Florida State University	Florida, Mississippi, Alabama, Georgia, South Carolina, North Carolina
March 22 and 23, 1965	Syracuse University	Eastern and Northern New York
March 25 and 26, 1965	Columbia University	New York City, New Jersey, New England States, Maryland, Delaware
March 29 and 30, 1965	Washington University (St. Louis)	Missouri, Arkansas, Kansas, Oklahoma, Southern Illinois
April 1 and 2, 1965	University of Iowa	Iowa, Nebraska, Northern Illinois
April 5 and 6, 1965	University of Minnesota	Minnesota, North Dakota, South Dakota, Western Wisconsin
April 8 and 9, 1965	University of Wisconsin	Wisconsin, Northern Illinois

Table 1 - Continued

Dates	Location	Area To Be Covered
April 12 and 13, 1965	University of Pittsburgh	Pennsylvania, West Virginia, Virginia
April 19 and 20, 1965	Michigan State University	Michigan
April 26 and 27, 1965	Indiana University	Indiana, Kentucky, Tennessee

and executing a participant registration setup, and making all necessary building and equipment reservations. The liaison personnel also supplied the project staff with a list of possible accomodations for their overnight stay while conducting the two-day lecture and in many cases made the actual reservations for the project staff. In addition, the materials which were used in the lectures were sent in advance to the liaison personnel who in turn mailed unused materials back to the project center in Columbus following the completion of the lectures at their institution.

A memorandum was sent in advance to each of these liaison personnel to assist them in making proper arrangements for the lecturers. This memorandum outlined what the project staff felt would be needed in the way of lecture room facilities, audio-visual equipment, publicity, and registration arrangements for participants. It was also pointed out in the memorandum that the PERT project only had funds to cover travel expenses for the lecture personnel and for materials to be distributed at the lecture so all room and equipment rentals or incidental expenses would have to be the responsibility of the local institution.

Participant Selection

Although the dissemination lectures were primarily intended for persons actively engaged in educational research and/or development, no attempt was made to select participants by any formal means. As stated in the proposal, a primary objective of the lectures was to

inform not only persons actively engaged in educational research but also other persons who could potentially benefit from utilizing PERT techniques. Thus the lectures were open to any persons interested in the general substance of the lectures.

Since one of the stated objectives of the lectures was to inform and since the costs of the project would remain somewhat constant regardless of the number of participants (only the cost of handout materials would fluctuate), no limits were placed upon audience size at any of the lectures. For planning purposes, it was anticipated that the maximum number of participants at any one session would be 100 persons.

Publicity

The size and composition of the audiences at the various lecture sites was dependent to a great degree upon the effectiveness of the publicity phase of the project. Several different procedures and techniques were used in order to publicize the lectures. The basic procedures used were the development of a publicity brochure and news releases.

A publicity brochure or flyer was developed in conjunction with the Publications Office of the College of Education, The Ohio State University. Information regarding dates and places along with the general purpose of the lectures was included in the flyer. These flyers were printed on a gray paper with red lettering on one side for easy folding and addressing purposes.

Since the American Educational Research Association is the largest organized body of educational researchers, it was considered a prime target for publicity on the dissemination lectures. The flyer was distributed to the attendees at the 1965 AERA convention in Chicago by placing approximately 500 of them on the registration desk. Fifty copies of the flyer were also sent to each liaison person at each dissemination lecture site for regional distribution and a supply was also forwarded to the U. S. Office of Education for their internal and external distribution.

The project staff enlisted the assistance of The Ohio State University News Bureau to help prepare a news release on the dissemination lectures. This news release was sent to major newspapers in the areas to be served by each of the regional lecture site centers. The OSU News Bureau also assisted in the formulation of a sample release which was sent to each area coordinator or liaison personnel to provide them with specific content for any publicity they would be sending out within their regional area. In addition, a chart was sent to each liaison man outlining the geographical extent of the regional area that he was responsible for covering in his publicity efforts.

Publicity announcements were also placed in various professional newsletters and journals, such as the AERA Newsletter, whose readership would be primarily educational research and/or development people. A list of the publications which were solicited to carry these announcements as well as the information sheet which was sent

to help them in writing the announcement as it would appear in their publication is included in Appendix A.

It was discovered during the course of the dissemination lectures that publicity efforts by the regional coordinators were predominantly in the form of personal contacts such as letters or phone calls. It appeared, moreover, that when an area coordinator sent out a formal announcement, it was generally sent to a group with which the coordinator was affiliated. In fact, a clear relationship seemed to exist between the professional specialization of the area coordinators and the audience at their respective dissemination lecture. At each center, the size and composition of the audience appeared to be dependent upon the particular interest and background of the coordinator assigned by the institution. For example, one center was coordinated by a person who primary affiliation was with educational administration. Consequently, the lecture announcement was distributed primarily to persons involved in school administration. Thus, if a coordinator was engaged primarily in research the audience usually had a large proportion of researchers but if the coordinator was an administrative specialist the audience tended to be composed of administrators. The observation noted above suggests that in future dissemination activities, such as the PERT lectures, careful consideration be given to the background and position of area coordinators in order to have reasonable assurance that the appropriate audience is being reached.

CHAPTER III

DISSEMINATION LECTURE PREPARATION AND CONTENT

This chapter describes the activities involved in the preparation of the lectures along with an overview of their content. For convenience in presentation, separate sections have been developed for the preparation and the content.

Preparation

The development, preparation, and presentation of the dissemination lectures was undertaken primarily as a joint responsibility of the project director and the assistant project director. The development and preparation of the lessons utilized several sources of materials in addition to the project staff. One major source was the Instructor's Manual on PERT prepared by the PERT Orientation and Training Center in Washington, D. C. This manual provided illustrative lesson plans for various topics along with recommended student activities. A set of two-by-two slides was also available for use with this manual. These slides were quite helpful in preparing subsequent overhead transparencies. The five volume Air Force series on PERT was also heavily utilized in developing lesson content. The project staff also had available to it a series of lesson plans from North American Aviation Company which were developed by its Training

Divisions and made available to the project by a consultant. During August of 1964 Mr. Don Frost, an instructor at the PERT Orientation and Training Center, consulted with the project staff on lesson preparation and gave invaluable assistance in lesson development.

In preparing the lectures, it was necessary to operate within a time constraint of a two-day period because of an earlier decision to provide only an orientation within such a period of time. Considerations with regard to content and activities of the dissemination lecture, therefore, always had to be evaluated in terms of the contribution of the topic to the overall purposes plus its immediacy and potential usefulness to the lecture participants. The advice provided by the consultants with regard to a general time frame for both the individual lesson topics and general lesson outline proved very helpful to the project staff since no extended effort was made to try out the lessons prior to their actual presentation. In retrospect, it was found that there was a time overrun on the first series of presentations but later adjustments deleting some material resulted in an appropriate time frame being maintained.

The steps taken in developing an actual lesson consisted of developing a lesson plan worksheet which provided space for the session number, the instructor's name, the visual aids to be used, the time length of the presentation along with the topic. Preliminary outlines were made for each lesson and then reviewed by the project

staff and consultants. Both the project director and assistant project director attended a week-long course at PERT Orientation and Training Center, Washington, D. C.

A decision was made early in the lesson preparation stage to use overhead transparencies rather than two-by-two slides. The primary reason for choosing this media form was the fact that available slide sets were inappropriate to the field of education. It was, therefore, easier to develop new or modify existing transparencies so as to make necessary illustrations more relevant to educational personnel. In most cases, drafts of the transparencies were prepared by the project staff and final completed drawings made by the Teaching Aids Laboratory of The Ohio State University. In some cases, the transparencies were not visible in large auditoriums, so efforts were made during the course of the lectures to change to a more appropriate size for viewing. As a general rule, participants did not receive copies of the visuals although many participants requested them. Some effort was made to meet this demand during and after the lecture series was completed but the task of production and distribution became more than the limited project staff could handle.

The project staff had utilized during some early local orientation and training sessions for educational personnel several films developed by the military and industry which provided the basic principles of concepts of network techniques. Of the several films available and exhibited from time to time, an orientation film of

about fifteen minutes in duration produced under the direction of North American Aviation Company[1] was found to be highly acceptable by untrained personnel. The decision was made therefore to incorporate this film into the training program. A second film running about 30 minutes and covering the basic concepts of PERT/COST was also accepted by untrained personnel and it was also incorporated into the lecture series.

The project staff decided that it would be quite advantageous to the dissemination process if participants could take home with them some item other than the notes that each participant might take. Two such items were obtained and/or developed for this purpose. The first item was a publication produced by Douglas Aircraft Corporation titled Why Play It By Ear - Use PERT. This pamphlet had been called to the attention of the project director and a request was made of Mr. Hal McDonald of Douglas Aircraft Corporation for a supply sufficient to meet the anticipated audience of the dissemination lectures. This request was granted and arrangements were made to include this pamphlet for distribution at the lecture sites.

The second item was a "date calculator" which had been developed by personnel at North American Aviation. This device consisted of an inner and outer wheel which allowed a person to coordinate time on the

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[1]The North American film was obtained from General Film Laboratories, 1546 Argyle, Hollywood, California for approximately $83.00. The PERT/COST was obtained from Duart Film Laboratories, 245 West 55th Street, New York at a cost of $93.00.

inner with calendar dates on the outer wheel by appropriate turning of the two wheels. The original date calculator was constructed of aluminum but the ones prepared for the dissemination lectures were made of a stiff cardboard. Both of these items were distributed at appropriate points during the dissemination lectures presentation.

The project staff's prior experience with PERT orientation plus attendance at various orientation sessions pointed up the necessity to have some kind of a simple exercise that participants could work on in order to gain greater understanding of network concepts. An exercise was developed which derived mainly from survey research methods and involved a projected study of faculty attitudes towards parking on a university campus. Initial drafts of the exercise were prepared and then reviewed by consultants. The total exercise was originally divided into five separate subexercises with stress put on particular topics such as activity identification, network construction, Expected Elapsed Time calculation, Earliest Expected and Latest Allowable date calculations, scheduling, and replanning. No attempt was made to build into the practical exercise any work relating to cost or budget determination. The practical exercises were duplicated in quantity and shipped in advance to each of the dissemination lecture sites for distribution at the proper time.

All of the lesson plans were prepared in triplicate copy. A notebook was made for each of the instructors with the third copy being maintained in the file for safety and record purposes.

Content

This section provides only a brief but succinct description of the content included in each of the major sessions. It is not feasible to present the lectures in detail nor to provide duplicate copies of the lesson plans as appendix materials for two reasons. First, lesson content and sequence were under continuous modification during the course of the lectures. Second, the inclusion of the original plus modified material would make the total report lengthy and bulky without serving any substantial purpose.

The overall two-day lecture presentation was divided into four general sessions. The first session dealt with the nature of management and basic PERT terminology and concepts. The second session was devoted to the practical exercise and sample problem. The third session presented some applications of network techniques to educational research and development of projects, the fourth session was devoted to PERT/COST plus a review and summary. Additional information regarding subject matter and activities for each of the sessions is described below. A copy of the general outline distributed to participants is included as Table 2.

First Session (A. M.) - The initial activities in the first session were devoted to courtesy matters involving the host institution as well as expressions of appreciation to the coordinator, followed by the introduction of the PERT project staff. A discussion of participant materials that had been distributed during a registration period along with an outline of the lecture was then made.

Table 2 - Dissemination Lecture Outline and Schedule

TIME	TOPIC
	FIRST SESSION
8:45 - 9:00	Registration
9:00 - 11:45	Introduction to Management and PERT The Management Process and Educational Research Basic PERT Terminology Network Construction Time Estimating Scheduling Probability
12:00 - 1:30	Lunch
1:30 - 4:30	**SECOND SESSION**
	Practical Exercises Activity Identification Network Construction Time Estimating Scheduling Project Replanning
9:00 - 11:45	**THIRD SESSION**
	Applying PERT to Educational Research and Development Projects PERTing the PERT Project Applications to Educational Projects Model Networks Project Applications Suggestions for Implementing PERT
11:45 - 1:30	Lunch

Table 2 - Continued

TIME	TOPIC
1:30 - 4:00	FOURTH SESSION Introduction to PERT/COST Review and Summary Questions and Answers Lecture Evaluation Award Certificates

The initial topic was a discussion of the relationship of the management function processes to educational research, particularly developing a rationale for the study of management systems that might apply to educational research and development. Such basic concepts as the management cycle, planning, the role of objectives, the inter-relationship of time-cost-performance were presented. After this presentation, the introductory PERT film was shown. Following the showing of the film, the basic PERT concepts and principles were then presented. Such terms as event, activity, network, critical path, and slack were discussed. After this general orientation to terminology, a presentation was made on worbreakdown structure development, including hierarchical nature of objectives. The procedures involved in developing networks including their functions and use, managerial aspects, network terminology, and rules of network construction were then reviewed. After a presentation of the work-breakdown structure and network construction, information relating to time estimation for activities and events was then presented, including some discussion of statistical assumptions. Attention was paid to calculating Expected Elapsed Time for an activity, Earliest Expected and Latest Allowable time for events and critical path. Following this topic, some discussion of the role of scheduling utilizing the time estimation information was made. A presentation followed on the role of computers in processing network calculations, followed by a brief discussion of the probability dimensions of PERT. A review and summary completed the presentation for the first session.

Second Session (P. M.) - This session was devoted almost entirely to the practical exercise referred to above. The purpose of the practical exercise was explained and a review of PERT terminology was made. The first item was devoted to developing a workbreakdown structure. The second item involved constructing a network. The third item was devoted to calculating activity times using multiple estimates. The fourth item was devoted to a calculation of the Earliest Expected Time (T_E) and the Latest Allowable Time (T_L). The fifth item was devoted to creating a schedule using the date calculator described above. The final item was devoted to a necessary replanning in view of certain problems which developed during the course of the project. The purpose of the latter exercise was to reinforce the decision-making in which the project director must participate. Each exercise had a problem sheet and a "school" solution sheet except for the last two exercises. Opportunity was provided to discuss each of the solutions.

Third Session (A. M.) - This session was devoted to the discussion of the application of PERT to educational activities. The nature and purpose of the PERT project itself was discussed along with the major objectives of the project. This introduction was followed by a description of how PERT was applied to the PERT Project including the initial development of the network and workbreakdown structure and selection of a computer program for network processing. Examples of networks developed and changes made during the course of the

project, showing how information was processed and decisions made, was also included. Sample computer printouts were distributed as part of this session.

The next topic presented was a discussion of the development of model workbreakdown structures and networks for various types of educational projects including such types as experimental, survey, test development, historical, and similar efforts. Illustrations of a workbreakdown structure and network for each of the several types were then presented.

Following the presentation on model networks for various types of research and development activities, the application of PERT to specific projects at Ohio State was then discussed. It was orginally intended that the project directors involved in these applications would be part of the dissemination lecture staff and would describe the application to their particular projects. This was actually followed in one instance where Dr. Daniel Stufflebeam gave a discusion of the revision of the GED Tests during the presentation at Florida State University. The primary reason for modifying the original approach was based upon the fact that it would have required a staff member to be gone for a week in order to make approximately two one-hour presentations. The PERT project staff questioned whether or not this would be a wise expenditure of a professional person's time. Details were presented regarding the initial procedures and computer application for each of the presentations showing

some of the problems involved. This topic was terminated by providing evaluative information regarding the project application phrase along with a summary of responses made by the project staff directors.

In addition to the applications described above, the participant's attention was called to other types of applications that were known to the project staff such as the establishment of junior colleges, the installation of computers, and similar applications. The session was concluded by outlining some suggestions for implementation of PERT in a specific situation. Attention was given to general considerations such as the specific steps that should be followed.

Fourth Session (P. M.) - The fourth session was devoted primarily to two major topics. The first was an introduction to the concept of PERT/COST. The second was devoted to a review and summary. The basic presentation on PERT/COST was made utilizing a set of slides available from the PERT Orientation and Training Center. Historical development of PERT/COST was reviewed along with the reasons for its development. In addition to the set of slides, a film developed by the PERT Coordinating Group in Washington on the nature of PERT/COST was shown to introduce the concepts. Emphasis was given to relating budgets to work or output categories rather than to traditional input categories.

The remaining portion of the fourth session was devoted to a review and summary of the content presented during the two-day

period. One essential dimension of this summary was comments by the project staff on the validity of PERT for educational research and the development activity both in the planning and controlling stages of a project.

This session was approximately two hours in duration. It was necessary to terminate the fourth session early at the end of any two-day orientation in order that the project staff could either make transportation connections to the next site or return to home for the weekend.

The general sequence of content presentation was generally satisfactory except for two major comments made by the participants. The first comment centered around a suggestion that the practical exercises be correlated with the substantive presentation in order that a particular concept have immediate reinforcement. A session devoted totally to content followed by exercises turned out to be inadequate learning experience. The second comment focused upon the short time given PERT/COST in the fourth session since no discussion in depth could be presented. A more detailed evaluation by the participants of the total training session is contained in the next chapter.

CHAPTER IV

EVALUATION OF THE LECTURES

No specific contracutal requirement existed to present evidence of either an objective or subjective nature relative to the success or failure of the dissemination project. The project staff decided to implement assessment procedures which would provide evidence to revise the presentation.

Measurements of substantive achievement were not attempted since the stated purpose of the lectures was to make researchers in education aware of the possibilities of PERT as a management tool. Had the purpose of the lectures been to train persons in the use of PERT rather than just to orient them to the technique, then measurements of achievement would have been appropriate. Several objective and subjective evaluations, representing different frames of reference were made and are described in this part of the report. Opinions of the participants about each lecture were secured immediately after each of the two-day programs was completed. The project director recorded a reaction to each lecture location including any changes made in the basic lesson outline for that lecture series along with a description of the facilities, arrangements and audience. An attempt was made to evaluate the dissemination lectures on the basis of conformity to the budget allocations which were planned at the onset of the project. The cost analysis report can be viewed as a case

study evaluation of the cost/effectiveness of a knowledge dissemination project such as that represented by the dissemination lectures. Each of these evaluations is discussed in detail in subsequent sections.

Participant Evaluation

At the conclusion of each two-day dissemination lecture, participants were given a questionnaire which they were to complete immediately. The questionnaire consisted of eleven structured-response items concerned with the substance of the session and one structured-response item asking for an evaluation of the instructors in terms of content knowledge and effectiveness of presentation. A copy of the questionnaire is included in Appendix A.

Generally speaking, the participants gave a very positive evaluation to the dissemination lectures. They indicated that the content of the lectures was both pertinent and useful to them and that the PERT staff did a good job of organizing and presenting the lectures. A summary of participant evaluations over all sessions is presented in Table 3. The total number of responses to individual items varies because some participants did not respond to all of the items.

Of the 247 participants who responded to the item concerning pertinence of the lectures to participants' work duties , 22 per cent indicated they had relevance. Almost 44 per cent of the participants indicated a significant degree of pertinence, slightly over 27 per cent indicated that the content was only somewhat pertinent to their work, while the remaining participants indicated that the content either had very little or no pertinence to their work.

Table 3 - Summary of Participant Evaluation of Lectures

Question	Response	Frequency	Percent
1. To what extent do you feel that the material covered in the lectures is pertinent to your work in the area of educational research and development?	A Great Deal	54	22.0
	Significantly	108	43.7
	Somewhat	68	27.5
	Very Little	8	3.2
	Not At All	9	3.6
		N=247	100.0
2. To what extent was the lecture material related to your duties?	Directly	141	55.3
	Indirectly	104	40.8
	Not At All	10	3.9
		N=255	100.0
3. Do you anticipate using the material presented in the lecture?	A Great Deal	29	11.6
	Significantly	106	40.5
	Somewhat	108	41.7
	Very Little	14	5.4
	Not At All	2	.8
		N=259	100.0
4. How effective was the use of visual aids (slides, movies, handouts) in the lectures?	A Great Deal	65	25.0
	Significantly	156	60.0
	Somewhat	34	13.1
	Very Little	4	1.5
	Not At All	1	.4
		N=260	100.0

Table 3 - Summary of Participant Evaluation of Lectures (cont'd)

Question	Response	Frequency	Percent
5. Of what value were the practical exercises to you?	A Great Deal	135	54.9
	Significantly	69	28.1
	Somewhat	36	14.6
	Very Little	6	2.4
	Not At All	0	0.0
		N=246	100.0
6. What was your reaction to the complexity of the practical problems?	Too difficult	1	.04
	Difficult	22	8.9
	Average	171	68.95
	Easy	49	19.9
	Too Easy	5	2.21
		N=248	100.0
7. How do you feel about the level of detail presented in the lectures?	Too detailed	8	3.2
	Detailed	77	31.0
	Average	143	57.7
	Gross	18	7.2
	Too Gross	2	.8
		N=248	100.0
8. What would be your overall rating of the lectures and how do you think they can be improved?	Excellent	84	34.4
	Good	144	59.0
	Average	13	5.3
	Fair	3	1.2
	Poor	0	0.0
		N=244	100.0

Table 3 - Summary of Participant Evaluation of Lectures (cont'd.)

	Question	Response	Frequency	Percent
9.	If the lectures were to be shortened by one session, which session would you suggest omitting?	First	6	3.6
		Second	11	6.6
		Third	63	37.7
		Fourth	87	52.1
			N=167	100.0
10.	Would you be interested in lengthening the lecture so PERT/Cost could be considered in more detail?	Yes	101	48.1
		No	109	51.9
			N=210	100.0
11.	Which session did you consider to be most informative?	First	106	43.3
		Second	94	38.4
		Third	38	15.5
		Fourth	7	2.8
			N=245	100.0
12.	How would you evaluate the instructors with respect to their presentation, knowledge of subject, and their ability to explain and clarify points?	Excellent	143	57.4
		Good	98	39.4
		Average	6	2.4
		Fair	2	.8
		Poor	0	0.0
			N=249	100.00

Although 93 per cent of the participants had indicated the lectures were in some degree pertinent to their work, only 55 per cent (based on 255 responses) noted a direct relationship between their work duties and the lecture material while 41 per cent indicated only an indirect relationship. The remaining 4 per cent of the participants indicated either that their work was not complex enough to warrant the use of PERT or that they held a teaching position where they would not have occasion to utilize PERT. Several of these participants were graduate students who attended the lectures out of curiosity.

Almost 94 per cent of 259 participants indicated that they anticipated making some use of the material presented in the lectures. About 12 per cent of these participants anticipated using the lecture material a great deal with over 40 per cent anticipated making significant use of it. Another 42 per cent indicated that they planned to use the lecture material somewhat. Again, there were a number of participants (6 per cent) who indicated that they were not involved in any of the management functions of educational research and/or development and therefore would have very little or no occasion to use the lecture material.

The use of visual aids during the lectures was considered effective by all but 2 per cent of the 260 participants who responded to this item. A fourth of the participants rated the effectiveness of the visual aids as great and 60 per cent rated it as significant. Although the participants almost unanimously evaluated the visual aids as effective in some degree, they also had numerous suggestions for

improvement. About 2 per cent of the participants suggested that future transparencies contain larger print so that they could be more easily read. Several participants further suggested that future transparencies have more color in them and better contrast. Another 2 per cent suggested that the project staff distribute handouts over the material presented by the slides.

All but six out of 246 participants felt that the practical exercises were of some value to them. Almost 55 per cent of the participants indicated that the exercises were of significant value to them, while 28 per cent said that the exercises were of great value. Of the six participants who indicated that the practical exercises were of little value - one person said that they were too difficult to be of much value for him, another cited the exercises as being too easy. Two participants said they had no intention of using PERT and the exercises were irrelevant to them and two other participants offered no comments on why the exercises had little value for them. Altogether, over 5 per cent of the participants suggested that more time be allowed to work on the exercises, and another 5 per cent also suggested that more explanation be given on how to complete the exercises.

It would seem from the response to the above item that a number of the participants found the practical exercises difficult although of some value. However, the practical exercises were considered to be of average complexity by 69 per cent of 248 participants, with only one person rating them as too difficult. Another 9 per cent considered the exercises to be difficult, 20 per cent found them easy, and

2 per cent considered them to be too easy. Several participants did suggest that the number of computations involved in the exercises be cut down. It was suggested by several participants that the exercises could be given throughout the lectures rather than during just one time segment. It was thought that in this manner the exercises could give more immediate reinforcement of the PERT principles and at the same time would not become boring to the participants.

The majority of the participants, 58 per cent of 248, also rated the level of detail in the lectures as being about average, with another 31 per cent considering the lectures detailed, and 7 per cent ranking them as being too gross.

The overall rating of the lectures was high, as 34 per cent of 244 participants gave a rating of excellent to the overall quality of the lectures. Another 59 per cent of the participants rated the lecture as good and over 5 per cent rated them as average. The most prevalent suggestion (approximately eleven times) for improvement was to eliminate some of the redundancies in the various lectures. There were almost as many observations (ten times) that the lectures would have been better if some of the examples and illustrations had been taken from an educational context rather than a military one. Several participants also indicated a desire for more handouts over the lecture material.

Reaction was mixed on the question of omitting one session from the lectures. Over half of the 167 participants who responded to this item favored omitting the fourth session (Introduction to PERT/Cost); almost 38 per cent favored omitting the third session (Application of PERT Technique to Educational Activities). However,

a full third of the total number of participants left this item blank with nearly all of them writing in that none of the sessions could be omitted.

The participants split even on the question of lengthening the lectures so PERT/Cost could be considered in more detail with slightly less than 52 per cent of 210 participants rejecting the idea of allowing more time for PERT/Cost. Several participants indicated that additional PERT/Cost material would be desirable but not in the initial presentations. They suggested that a follow-up lecture be conducted on PERT/Cost since many of those attending the general PERT lectures would have little need or interest in PERT/Cost.

The first session was rated by 43 per cent of 245 participants as being the most informative followed closely by the second session with 38 per cent of the participants favoring it. The third session, which on an earlier item had been selected for omission from the lectures by 38 per cent of 167 participants, was rated as the most informative session of the lectures by over 15 per cent of 245 participants. Several participants indicated that since they had come to the lectures with the sole purpose of finding out the nature and uses of PERT, the first session was the most informative to them.

The instructors fared quite well on the final question which evaluated them in respect to their presentation, knowledge of the subject and ability to explain and clarify points. Over 57 per cent of 249 participants rated the instructors as average, with the exception of one person who rated them as poor on presentation but excellent in the other categories.

Responses to each of the twelve items categorized by lecture site are presented in Appendix B. The general pattern noted above was also exhibited in the responses from the individual locations.

Based upon the evidence obtained from the participant evaluation, it can be summarily stated that the lectures were well accepted by those persons attending them. Several suggestions advanced by participants for improvement of the lectures were eventually incorporated as may be noted in the following section on the project director's reports.

Lecture Site Evaluations

This section of the report is devoted to a series of short descriptions of reactions recorded by the project director at the actual site of the regional dissemination lectures. Each regional lecture and lecture site is described separately to show their interrelatedness. With one or two minor editorial changes, the reactions presented below are verbatim copies of the original notes.

University of California (Berkeley). (Monday-Tuesday, March 1-2). The lectures were conducted at Tolman Hall. Approximately 40 participants attended the morning session on Monday, and 25 participated in the afternoon session that same day. Attendance on Tuesday was about 27 for both sessions.

The morning session on Monday started about 9:15 with an introduction by Dean Keller, Dean of the College of Education. The script was then covered through to the movie. A five to ten minute break was taken at 10:30. Due to the delay in starting, some of the material had to be covered too quickly. Also, some material tended to be

repetitious while other material was misplaced in terms of the topic. The morning script was revised so as to allow more time for emphasis on basic points. Other than the above points, the morning session went well.

The afternoon session also went very well. One or two small errors appeared in the problems. The participants felt that the practical exercise was quite worthwhile. The afternoon session was concluded about 4:15 with a quick summary. The sessions on Tuesday went according to the script and few problems were encountered.

Wednesday, March 3, was spent on revising the materials before departing for the University of Southern California. This initial lecture emphasized the need to either start the first session promptly or move the rest of the program back so as to adjust for a late start.

University of Southern California. (Thursday-Friday, March 4-5). Registration was very light at USC with only 12 persons in attendance. Most of the participants were from agencies such as the United States Air Force and System Development Corporation but within such agencies many had responsibility for educational activities.

The Thursday session, March 4, was conducted according to the script as revised after the Berkeley lectures. The revised session went quite smoothly. On Friday the morning session started late (15 minutes) and as a consequence some of the morning material carried over to the afternoon session. The staff received several requests for copies of the visuals as had happened at Berkeley.

Florida State University. (Monday-Tuesday, March 15-16). About

45 persons attended the lectures conducted in the Student Union building at Florida State University. The registration setup was the best encountered so far but the arrangements for the visuals were not too good although satisfactory. The first session ran a bit later than usual (until noon) consequently the final portion had to be hurried. The afternoon session seemed to go pretty well.

On Thursday about 30 participants still remained despite the fact that several had previous experience with PERT. The presentation on Tuesday was varied slightly in order to see if the PERT Project application could be included as part of the project application phase. The revision did not appear to be satisfactory so the old presentation form was retained. The PERT/Cost session was hindered by difficulties with the projector. The light from the projector was completely insufficient and the room had to be darkened to the point where participants could not take notes. Lesson learned: check all slides the first day so adjustments can be made if they do not project.

It became apparent after this lecture that Practical Exercises No. 5 and No. 6 needed revision. The scheduling of activities showing slack was added to Practical Exercise No. 5, thus making it more consistent with the principles of scheduling. Practical Exercise No. 6 was revised to ask participants to replan according to selected decisions (e.g., add more key punch, eliminate tryout).

Syracuse University. (Monday-Tuesday, March 22-23). Approximately 60 persons attended the lectures, which were held in the Northway Motel on the outskirts of Syracuse. The setup at Syracuse was very good and represented a great deal of thought and work by the host

institution. Participants were there from New York, Vermont, Massachusetts and New Jersey; they all appeared to be highly interested in PERT. The session on Monday, March 22, followed the same presentation as was used at USC and went quite smoothly.

The morning session on Tuesday started late due to interest in the Project Gemini launch that morning. Consequently, some of the detailed presentation on the project application phase was deleted. After lunch the staff presented some suggestions for implementing PERT.

Pictures were taken during the sessions and were carried on television on the evening of March 23. The size of the audience and the room at Syracuse gave convincing evidence that some of the visuals should be prepared also as handouts. A call was made to the staff in Columbus to put this process in motion.

Columbia University. (Thursday-Friday, March 25-26). An auditorium in Macy Hall which seated 150-157 persons was the site for the Columbia lecture. The audio-visual set-up was good and the registration procedures were also quite satisfactory but attendance was small with only 15-20 participants. Some confusion seemed to exist regarding publicity. Some persons in the city area were not made aware of the conference and heard about it only through Phi Delta Kappa and other national sources. A couple of participants were from Albany and attended upon the recommendation of persons attending the lectures at Syracuse.

The morning session on Thursday, March 25 contained several changes. Several of the visuals were eliminated and the introduction to PERT was shortened, using the management cycle as a means of orientation. Introductory material on educational research and development was to

be shifted over to the morning session on Friday. Even with the visuals reduced, the morning session was still long but did seem to go better. Computer printout sheets were introduced after the practical exercise in order to illustrate both computational procedures and types of output reports. The printouts seemed to be well-received.

The morning session on Friday was conducted as previously with little change. However, more detail than usual was included in the project applications phase and as a consequence the material on educational research and development which had been shifted from the Thursday session did not get included. Implementation steps were also expanded in the afternoon session. Several new slides on PERT/Cost were also included and seemed to help clear up some ambiguities.

The confusion over responsibility for regional publicity suggests that in the future a form letter should be sent to the liaison men asking them what publicity arrangements they have made and emphasizing that they are responsible for assuring a good audience.

Washington University. (Monday-Tuesday, March 29-30). The room for the lectures was Steinberg Hall, a fair sized auditorium. The registration procedures were well executed but again the attendance was small with about 20 participants. About one-third of the participants were from a nearby Air Force installation. There were few from Washington University since the school was then in the semester break and most professors had left for a few days.

The sessions on Monday were held as previously. It was decided to adjourn at 3:15 P. M. due to prior commitments on the part of a

majority of the participants.

The morning session on Tuesday started slightly late due to delay in transportation from the motel where the staff was staying. Consequently there was little time to organize before starting. A completely new organization of the material was attempted, using the management cycle as a way of organizing the material on project application. The sequence was a little loose and the group was not too enthusiastic, possible because of their own prior experience with PERT and/or lack of interest in education activities. It was decided to try the same organization at Iowa to see how they would respond.

The afternoon session on Tuesday was late getting started, which caused some problems in holding the attention of the group. Also, the wind-up was too brief. A good termination point, other than a review of what was already covered, seemed to be needed.

University of Iowa. (Thursday-Friday, April 1-2). The first session of the lectures at the State University of Iowa started on time in Butler Hall with approximately 60 persons attending. The majority of the participants were school administrators although there were also some persons there from Iowa State University. Excellent seating arrangements and good facilities for coffee breaks helped the sessions. The reduced number of visuals was used again and worked out well. The morning session concluded at 11:45 A. M.

The afternoon work session went well considering the group size, although there was some difficulty keeping quiet since they finished at different times. The final activity of the afternoon session was computer processing of PERT data.

Friday's morning session convened on time with the material presented in the same format as at Washington University, organized around the steps of the management process or cycle. It appeared to work well except that networking and scheduling could have had more "applications". Also, illustrative examples of activity and event cards would have been useful.

The afternoon session was a bit late in starting, however it was finished by 3:00 P. M. The staff noted that here, as with all the other lecture sites to date, there was a slight problem of obtaining steady attention. The third and fourth sessions were always less crowded than the first two.

University of Minnesota. (Monday-Tuesday, April 5-6). The lectures, held in the Coffman Memorial Union, were conducted at the University of Minnesota in the same format as at the University of Iowa. The attendance, however, was only six in the morning session and two in the afternoon session. The attendance for Tuesday was limited to four at both sessions.

In checking the reasons for the lack of participation it was discovered that the area coordinator was not clear on exactly how the publicity was to be handled. He appeared to assume that the PERT staff would send publicity notices to all schools in the geographical area. Consequently, he did not send any notices to schools outside of the Minneapolis area. In fact, since all of the participants were administrators at the host university, it appeared that notices were not sent outside the university. The coordinator admitted that perhaps he should have investigated the publicity angle but claimed that a lack of office staff would have made it impossible to assume any

publicity responsibilities anyway. The need for more communication about publicity responsibilities again became quite clear to the Project staff.

University of Wisconsin. (Thursday-Friday, April 8-9). Registration procedures were very well handled at Wisconsin and it appeared that much effort had gone into the publicity and related activities to insure a good audience. Even with rainy weather approximately 60 persons attended, many coming from places outside of the state.

The morning session on Thursday went well, although several changes were made in the script. The new bulletin on computer printouts was used for the first time and seemed to help very much. The two handouts on event/activity dependencies were not used because they were too incomplete and required too much hand drawing to be done by the group. The afternoon session went according to the revised script and was ended, as usual, about 4:00 P. M.

The morning session on Friday was much the same as at Minnesota, but some new handouts were included which seemed to make it go better. A couple of new ideas were also added to the PERT/Cost presentation which helped to strengthen it. The afternoon session went according to schedule and was ended at 3:00 P. M.

University of Pittsburgh. (Monday-Tuesday, April 12-13). The lectures were held in the Supper room of Shenley Park (the Student Union building). The set-up consisted of chairs with no tables, which presented some difficulty in doing the practical exercises. It appeared that much effort had gone into the publicity since there were about 55 persons attending the initial session. The participants

came from many places including the State Department of Public Instruction as well as from some of the small universities and private consulting firms and/or similar agencies. About 30 participants stayed through the fourth session.

Due to some difficulty in getting audio-visual arrangements set up, the first session started about 15 minutes late. Further, because of difficulties with Dr. Cook's voice, Mr. Stahl made the morning and afternoon presentation on Monday.

The new material on scheduling did not arrive until late Monday morning so parts of it were not available for the morning session but were available for the afternoon. In working out the revised Practical Exercise No. 5, an error was discovered which caused some minor confusion among the participants. A connection was immediately noted, but still perhaps left some persons slightly confused. The staff felt that Practical Exercise No. 6 may turn out to be somewhat confusing since some activities were changed but other changes which would logically follow were not made. The afternoon session went according to schedule.

The third session was conducted according to the revised script as presented at Iowa. This revised script appears to work satisfactorily, but there seems to be a demand on the part of the participants for more detail on the mechanics of working out the problems. Generally, the session was on schedule except for the coffee break which took a bit longer, hence there was not time for questions in the morning. The afternoon session, however, went as in the past and finished about 3:00 P. M.

Several events at this lecture served to point out problems which

could have been avoided by proper preparation. Again, as was the case at previous lecture sites, the first session started late because the lecture staff failed to check the audio-visual equipment in advance. Dr. Cook's loss of voice and consequent inability to deliver the lectures on the first day, pointed out a problem which could have been quite serious. Fortunately, Mr. Stahl knew the material and was able to step in and handle the lectures by himself. Had Mr. Stahl not been prepared for such an emergency, the lectures would have had to have been canceled, causing much inconvenience and loss of money to both the project and the participants.

Michigan State University. (Monday-Tuesday, April 19-20). The lectures were held in the Kellogg Center which was filled to its 50 person capacity for the first session. The registration procedures, which included advance registration, were well handled and the facilities and physical arrangements were more than adequate. Approximately a dozen of the first session participants were individuals attending a Vocational Education Research Conference which started that evening and continued the rest of the week. Many of these persons had heard about the lectures from other sources and decided to combine the two events. Persons also attended from the State Department of Public Education as well as from other universities in the area.

The morning session on Monday was conducted according to the revised script and seemed to go quite well. The afternoon session also went according to the revised script and was completed about 4:00 P. M.

The number of persons attending the final two sessions dropped to about thirty due primarily to the absence of the persons attending

the Vocational Education Research Conference. The session started on time in the morning and the afternoon session ended at the usual 3:00 P. M. The first two sessions were also conducted according to the regular revised script.

Indiana University. (Monday-Tuesday, April 26-27). The lectures at Indiana were held in the new University School which is located immediately adjacent to the main campus. Without condemning any one person in particular, the arrangements at Indiana University were inadequate. The area coordinator submitted a list of letters sent out in the area and it indicated a rather limited potential audience. In addition, some participants revealed that information about lectures was not received until the end of the week just prior to the lecture.

The room arrangements were satisfactory except that the facility provided was a large lecture room which was not needed with the small size of the group who attended. Also the room was cold, causing many participants to feel uncomfortable. Some participants reported that in checking with several offices on the campus, no one was able to tell them quickly where the conference was being held and thus were late arriving for the first session.

The morning session started about a half-hour late because the project staff had to secure audio-visual equipment. Attendance was small, with only 13 registrants. During the afternoon session only eight persons were in attendance, possibly due to the fact that the regional coordinator left during the lunch break for an out-of-town conference.

The morning session started on time Tuesday with only one change in the regular presentation. More time and attention was given to other applications of PERT in the field of education than those stemming directly from the PERT Project. This change was instituted on a trial basis to see how the audience would react. The change was made because many participants at other lecture sites had indicated that they would like to know more about what was going on in other parts of the country. Reaction to the change appeared to be positive.

No major changes were made in the presentation of the final session and the final lecture in the series was concluded about 3:00 P. M.

Summary. The technique of recording reactions immediately turned out to be a fairly good device for receiving evidence and is recommended for similar kinds of efforts. While its use might be limited by a type of "first impressions" atmosphere, the lessons learned and recorded at the time were quite helpful in revising the lecture series as they progressed.

Cost Analysis

The rather unique method of dissemination incorporated into the project required a rather substantial amount of funds to carry out. Because of this situation, a decision was made to attempt to include some form of cost/effectiveness analysis as part of the evaluation of the lecture series. The purpose of this section is to present the procedures employed and results obtained with regard to a cost analysis of the dissemination lecture series.

The contract negotiated with the Office of Education allocated a total of $42,622 for the overall project. It would have been highly desirable to secure a rather firm estimated cost figure for the dissemination lectures. The selection of host institutions required both time and resources and did not commence until after the contract was negotiated. Since the location of the lecture sites would be crucial to any estimation of expenses such as travel and per diem, it was not possible for the project staff to submit an itemized estimate of dissemination lecture expenses. Once the lecture sites had been selected and related arrangements established, it was possible to secure an estimated cost for the series of lectures. The estimated cost figures are shown in Table 4.

The manner in which the travel and other arrangements were made for the dissemination lecture made it difficult to compute the actual costs associated with conducting each regional lecture. The schedule was set up so that a minimum amount of travel would be involved between any two lecture sites. Thus transportation costs to the Los Angeles sites were relatively low since the lecture there was conducted one day after the lecture at Berkeley. For purposes of actual costing, such trips were treated as a single five-day session. The actual costs derived on this basis are presented in Table 5.

In deriving the actual costs presented in Table 5, the cost of materials (e. g., movies, transparencies, handouts, worksheets, and related items) have been included as an average for all lectures rather than differing from site to site as they actually did since it was almost impossible to break out such costs on a per site basis. The totals in the staff wages column of Table 5 were determined by multi-

Table 4 - Estimated Costs for Dissemination Lecture Series
(Excluding salary and material costs)

Location	Number of days	Number of staff	Travel	Per Diem	Total
University of California and University of Southern California	7	3	$798	$336	$1,134
Florida State University	4	3	345	192	537
Syracuse University and Columbia University	6	3	234	288	522
Washington University and University of Iowa	6	3	315	288	603
University of Minnesota and University of Wisconsin	6	3	294	288	528
University of Pittsburgh	3	3	84	144	228
Michigan State University	3	3	141	144	285
Indiana University	3	3	144	144	288
Totals	35	-	$2,355	$1,824	$4,179

plying a daily rate for each of the lecture staff members conducting the lecture by the number of days spent traveling to the site, conducting the lecture, and either returning to the project headquarters or traveling to the next lecture site. The wage figure was based on the daily salary of the lecture staff using a five-day week. Per diem costs included such items as meals, hotels, telephone calls for calling project headquarters during the lecture series, and for baggage charges at the hotel where the lecture staff stayed. Travel costs included air fare, taxi or limousine travel to and from airports, and car rentals.

Direct comparison between the estimated figures shown in Table 4 and the actual figures shown in Table 5 are not entirely possible since different procedures were used in obtaining the data. For example, the estimated costs were made on the basis of three persons traveling to each lecture site. This actually happened on only two occasions as noted in Table 5.

Because of the difficulty of making the direct comparison between estimated and actual costs, some other means of arriving at a useful cost/effectiveness analysis was deemed desirable. The procedure employed was to relate the cost of the lecture series to the number of participants served or to establish <u>per participant cost</u>. Using the actual cost figures presented in Table 5 and dividing by the number of participants attending the lectures at each site, per participant costs were established for each combination of trips plus for the total series of lectures. These costs per participant are shown in Table 5.

Table 5 - Actual Costs and Per Participant Cost for Dissemination Lecture Series

Location	Number of Staff	Number of Participants	Travel	Per Diem	Wages	Materials	Total	Cost per Participant
University of California and University of Southern California	2	36	524	156	488	177	1,345	37
Florida State University	3	23	311	103	293	88	795	35
Syracuse University and Columbia University	3	53	286	206	563	177	1,232	23
Washington University and University of Iowa	2	45	212	172	488	177	1,049	24
University of Minnesota and University of Wisconsin	2	41	214	158	488	177	1,037	25
University of Pittsburgh	2	28	66	63	195	88	412	15
Michigan State University	2	29	48	60	195	88	391	14
Indiana University	2	7	27	73	195	88	403	58
Totals		262	1,708	991	2,905	1,060	6,664	26

NOTES: 1. All costs rounded to nearest dollar amount
2. Per diem cost includes hotel, meals, and miscellaneous

While costs varied from session to session, the average costs were approximately $26 per participant. Evaluation of this figure is difficult to make since there are no previous standards against which to make comparison. Each reader can make his own interpretation as to whether or not the direct cost per participant is too high or low for substantive information presented by the dissemination lecture series employed by the project.

Summary

The purpose of this chapter has been to present evidence of both a quantitative and qualitative nature relative to the general effectiveness of the lecture presentations as well as the overall dissemination lecture series. Evaluations were secured from participants attending the sessions, from the director at the time each session was carried out, and from the records of the project with regard to a cost analysis of the lecture series.

Based upon the evidence presented from the above three sources, the project staff believes that the dissemination lectures accomplished their prime objectives of reaching a segment of the educational research community and introducing that community to the concept of PERT. Participant evaluations indicated that the concept was adequately presented but needed more direct relationship to educational practice. The director's reactions focused primarily upon an administrative evaluation of the presentation. Evidence here indicated that physical arrangements, techniques of presentation, and functions of liaison personnel were important in conducting such dissemination efforts. Based upon original plans for the project that called for a possible

1,200 participants at the lecture series, the actual cost per participant of $26.00 each seems extremely high. In actuality, the figure might not be unreasonable since there is no real way of establishing the validity of the anticipated participants at each of the sessions.

The data presented in this chapter represents immediate reactions. The effectiveness of the lecture series might be long range. For this reason, a follow-up study was conducted approximately six months after the completion of the lecture series. The results of this study are reported in Volume II of this two volume series.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

The purpose of this chapter is to summarize the purposes, procedures and evaluation results of the dissemination lectures. A set of recommendations relative to methodological problems encountered while conducting the lectures based upon observations is also included in this chapter. Conclusions on the long-range effectiveness of the lectures were derived mainly from the questionnaire which was sent out after completion of the lectures and therefore are included in Volume II of this report.

Purpose

Broadly speaking, the purpose of the dissemination lectures was to inform the educational research community about PERT, a management technique developed for planning and controlling research and development activities, and to encourage its use.

More specifically, the lectures were designed to accomplish two main objectives: (1) to reach the largest possible number of actual and potential educational researchers, and (2) to disseminate information to them on the principles and utilization of the PERT technique.

Procedures

Several different activities were initiated by the PERT staff in an attempt to realize the two objectives mentioned above. The first objective of reaching a designated audience demanded both the selection of suitable locations for conducting the lectures and appropriate measures to secure the type of audience which was desired. Consequently, twelve universities which fulfilled certain criteria concerning the size and composition of a potential audience within easy traveling distance were selected as lecture sites.

A liaison person was then selected at each lecture site to assist in coordinating efforts between the project staff and the host institution. These liaison men were responsible for the physical arrangement at their lecture site and for efforts to locally publicize the lecture in their area.

In addition to local efforts by the liaison man, publicity was also secured on a national level by the project staff. Announcements and descriptions of the lectures were placed in numerous professional journals and were also made available to attendees at the 1965 AERA convention in Chicago.

The second objective of effectively disseminating information was related to the first objective in that the coordinating efforts (publicity, securing visual aids equipment, reserving conference space) of the liaison personnel made it possible for the project staff to effectively communicate with the participants at the various lecture sites. The effectiveness of the lectures, however primarily

depended upon the organization and presentation of the material by the project staff. The content material was divided into four parts or sessions. These sessions were arranged in ordered sequence from a general overview of PERT to a presentation of PERT/COST, a specialized analytic technique. Participant responses to a questionnaire administered at the completion of each regional lecture were the primary sources of feedback on the effectiveness of the presentation for the project staff. The staff made several changes between lecture sites in both content and method of presentation. Changes which were well received by the participants were retained as part of the regular presentation. Thus the materials and presentation form used at a particular lecture site depended somewhat upon how effective they were at the previous lecture sites.

The participant evaluations from each lecture site, a cost analysis index based on per capita costs for each regional lecture, and a short evaluation which the project staff completed after each lecture were all used to evaluate the extent to which the two main objectives of the dissemination lectures were reached. The evaluation section of this report reveals that in general both objectives of the lectures were met, although publicity arrangements in some instances were unsatisfactory and the first objective was not met at several lecture sites.

Recommendations

Based upon the description of the various phases of the dissemination lecture project as presented in the previous chapters and based upon personal experience gained by the project staff in the actual conducting of the lectures, the following recommendations are offered for conducting future dissemination projects of this type.

1. The selection of the area coordinators should be made carefully since this person appears to be quite influential in determining the size and composition of the audience. Of particular importance is the correlation which seemed to exist between interests of the area coordinator and the interests of the persons who attended the lecture in that area.
2. The confusion over responsibility for regional publicity at several lecture sites indicates that a form letter should be sent to the area coordinators asking them what publicity arrangement they have made and emphasizing their responsibility for securing an audience which generally fits the criteria specified by the project staff.
3. Projection equipment should be checked in advance of each regional lecture to assure smooth operation. Visuals should be checked to assure readability, especially when the size of the facility for the lecture is not known in advance.

4. More workshop-like activities should be included so that participants can be actively involved as soon as possible in the topic being presented.
5. Practical activities should be introduced early into the lecture sequence so that participants do not have to sit through "talked-at" sessions.
6. Some type of lesson outline set up so that notes taken would be very useful. High points could be noted and space provided for the participants to fill in the detail.
7. If at all possible a dry-run should be made with an audience very similar to the projected audience in order to try out the length of presentations, eliminate repetition of ideas and concepts, interweave audio-visual materials, and screen other planned activities.

APPENDIX A

1. Dissemination Center Evaluation Worksheet
2. List of Publications Carrying Publicity Announcement
3. Publicity Information Sheet
4. Participant Evaluation Questionnaire

The PERT Project, Bureau of Educational Research and Service
The Ohio State University, Columbus 10, Ohio

DISSEMINATION CENTER EVALUATION WORKSHEET

Proposed center _____ Location _____

Rater	Criterion	Rating
____	1. Research activity (project support by USOE and other agencies, past research history, research potential)	1 2 3 4 Little Some High
____	2. Travel accessability (proximity to major airlines, etc.)	1 2 3 4 Poor Good Excellent
____	3. Population (density of immediate and regional areas in terms of possible attendees)	1 2 3 4 Low Average High
____	4. Geographical location (site removed from other possible centers)	1 2 3 4 Adjacent Near Removed
____	5. Flexibility (restriction placed on available dates)	1 2 3 4 High Some None
____	6. PERT Interest and Experience (expressed interest and evidence of initial experience with systems technique	1 2 3 4 None Average High
____		

Total Rating: _____

Final Action: ☐ Selected

☐ Rejected

PUBLICATIONS CARRYING ANNOUNCEMENTS OF LECTURES

1. Phi Delta Kappan
2. American Psychologist
3. Newsletter, American Educational Research Association
4. Newsletter, National Council on Measurements in Education
5. Newsletter, Division 15, American Psychological Association
6. Theory Into Practice, The Ohio State University
7. Newsletter, Association for Educational Data Systems
8. Newsletter, Laboratory for Experimental Design, College of Education, University of Wisconsin
9. Coming Events Column, Data Processing Magazine
10. Journal of Counseling Psychology
11. Personnel Guidance Journal
12. Communications of the Association for Computing Machinery.

The Bureau of Educational Research and Service of The Ohio State University announces a series of twelve lectures to be held during 1965 the purpose of which is to disseminate information about the applicability of PERT to educational research and development activities. PERT, an acronym for Program Evaluation and Review Technique, is a recently developed management technique considered to be a highly useful tool for the planning and conducting of research and development activities characterized by a "once-through" nature. The dissemination lectures are being supported by a grant from The Cooperative Research Program of the U. S. Office of Education.

The specific dates and locations for the lectures are as follows:

March 1- 2, 1965	University of California (Berkeley)
March 4- 5, 1965	University of Southern California (Los Angeles)
March 15-16, 1965	Florida State University
March 22-23, 1965	Syracuse University
March 25-26, 1965	Columbia University
March 29-30, 1965	Washington University (St. Louis)
April 1- 2, 1965	State University of Iowa
April 5- 6, 1965	University of Minnesota
April 8- 9, 1965	University of Wisconsin
April 12-13, 1965	University of Pittsburgh
April 19-20, 1965	Michigan State University
April 26-27, 1965	Indiana University

In addition to the lecture series, a workshop emphasizing application to on-going and proposed projects will be held at The Ohio State University Campus on May 10, 11, and 12, 1965.

Further information regarding the PERT project, the dissemination lectures, and the workshop may be obtained from Dr. Desmond L. Cook, Director, The PERT Project, 41 West 11th Avenue, Columbus 10, Ohio.

The PERT Project
Bureau of Educational Research and Service
The Ohio State University
41 West 11th Avenue
Columbus, Ohio 43210

EVALUATION QUESTIONNAIRE

In the interest of improving the lectures on "The Program Evaluation and Review Technique," we would appreciate your opionions and judgment as expressed by the following questions. You are asked to sign this questionnaire in the place provided at the end.

1. To what extent do you feel that the material covered in the lectures is pertinent to your work in the area of educational research and development? Please give reasons for your answer.

_____ Not at all
_____ Very little
_____ Somewhat
_____ Significantly
_____ A great deal

2. To what extent was the lecture material related to your duties?

_____ Directly
_____ Indirectly
_____ Not at all

3. Do you anticipate using the material presented in the lecture? Please explain.

_____ Not at all
_____ Very little
_____ Somewhat
_____ Significantly
_____ A great deal

4. How effective was the use of visual aids (slides, movies, handouts) in the lectures? Comments.

_____ None
_____ Very little
_____ Somewhat
_____ Significant
_____ Great

5. Of what value were the practical exercises to you? Comments.

_____ None
_____ Very little
_____ Somewhat
_____ Significant
_____ Great

6. What was your reaction to the complexity of the practical problems? Comments.

_____ Too easy
_____ Easy
_____ Average
_____ Difficult
_____ Too difficult

7. How do you feel about the level of detail in the lectures? Comments.

_____ Too detailed
_____ Detailed
_____ Average
_____ Gross
_____ Too gross

8. What would be your overall rating of the lectures and how do you think they can be improved? Please be specific as possible.

_____ Excellent
_____ Good
_____ Average
_____ Fair
_____ Poor

9. If the lectures were to be shortened by one session, which session would suggest omitting?

_____ First
_____ Second
_____ Third
_____ Fourth

10. Would you be interested in lengthening the lecture so PERT/COST could be considered in more detail?

_____ Yes
_____ No

11. Which session did you consider to be the most informative?

_____ First
_____ Second
_____ Third
_____ Fourth

12. How would you evaluate the instructors with respect to their presentation, knowledge of the subject and their ability to explain and clarify points?

_____ Excellent
_____ Good
_____ Average
_____ Fair
_____ Poor

NAME _____

POSITION _____

ADDRESS _____

LECTURE LOCATION _____

APPENDIX B

Table 6 - Participant Evaluation of Lecture Relevancy to Work

Question: To what extent do you feel that the material covered in the lectures is pertintent to our work in the area of educational research and development?	N	Responses: Not at All	Very Little	Somewhat	Significant	A Great Deal
University of California	26	2	-	6	11	7
University of Southern California	10	-	-	-	5	5
Florida State University	23	-	1	7	10	5
Syracuse University	36	-	-	8	23	5
Columbia University	16	-	1	2	8	5
Washington University	11	-	1	3	7	-
University of Iowa	31	1	3	11	13	3
University of Minnesota	4	-	-	-	4	-
University of Wisconsin	32	5	-	14	8	5
University of Pittsburgh	24	1	2	9	5	7
Michigan State University	28	-	-	7	10	11
Indiana University	6	-	-	1	4	1
Totals	247	15	8	68	108	54

Table 7 - Participant Evaluation of Lecture Relevancy to Duties

Question: To what extent was the lecture material related to your duties?	N	Responses: Directly	Indirectly	Not at All
University of California	26	12	11	3
University of Southern California	10	8	2	-
Florida State University	23	15	8	-
Syracuse University	32	18	14	-
Columbia University	16	11	5	-
Washington University	13	6	7	-
University of Iowa	31	14	16	1
University of Minnesota	4	1	3	-
University of Wisconsin	37	17	19	1
University of Pittsburgh	27	13	10	4
Michigan State University	29	22	7	-
Indiana University	5	4		1
Totals	253	141	102	10

Table 8 - Participant Evaluation of Anticipated Use of PERT

Question: Do you anticipate using the material presented in the lecture? Please explain.	N	Responses: Not at All	Very Little	Somewhat	Significant	A Great Deal
University of California	26	-	-	11	11	4
University of Southern California	10	-	-	2	5	3
Florida State University	24	-	-	11	10	3
Syracuse University	37	-	3	14	16	4
Columbia University	17	-	1	3	8	5
Washington University	13	-	2	4	6	1
University of Iowa	30	1	3	17	6	3
University of Minnesota	4	-	-	2	2	-
University of Wisconsin	36	1	3	17	13	2
University of Pittsburgh	26	-	2	15	8	1
Michigan State University	29	-	-	11	14	4
Indiana University	7	-	-	1	6	-
Totals	259	2	14	108	105	30

Table 9 - Participant Evaluation of Teaching Aids

Question: How effective was the use of visual aids (slides, movies, handouts, in the lectures? Comments.	N	Responses: None	Very Little	Somewhat	Significant	Great
University of California	27	-	-	10	14	3
University of Southern California	10	-	1	1	5	3
Florida State University	24	1	-	2	18	3
Syracuse University	35	-	2	11	17	5
Columbia University	15	-	-	1	8	6
Washington University	13	-	1	-	10	2
University of Iowa	32	-	-	2	18	12
University of Minnesota	4	-	-	-	2	2
University of Wisconsin	37	-	-	1	25	11
University of Pittsburgh	28	-	-	4	14	10
Michigan State University	28	-	-	2	21	5
Indiana University	7	-	-	-	4	3
Totals	260	1	4	34	156	65

Table 10 - Participant Evaluation of Practical Exercises Value

Question: Of what value were the practical exercises to you? Comments.	N	Responses: None	Very Little	Somewhat	Significant	Great
University of California	26	-	1	5	16	4
University of Southern California	9	-	1	1	4	3
Florida State University	23	-	1	7	9	6
Syracuse University	32	-	1	3	15	13
Columbia University	15	-	-	2	9	4
Washington University	13	-	-	3	8	2
University of Iowa	30	-	1	4	20	5
University of Minnesota	3	-	-	-	3	-
University of Wisconsin	34	-	1	6	18	9
University of Pittsburgh	27	-	-	2	18	7
Michigan State University	27	-	-	2	13	12
Indiana University	7	-	-	1	2	4
Totals	246	-	6	36	135	69

Table 11 - Participant Evaluation of Practical Exercise Complexity

Question: What was your reaction to the complexity of the practical problems? Comments.	N	Responses: Too Easy	Easy	Average	Difficult	Too Difficult
University of California	27	2	6	15	4	-
University of Southern California	9	-	-	8	1	-
Florida State University	24	1	7	14	2	-
Syracuse University	33	-	4	27	2	-
Columbia University	15	-	7	6	1	1
Washington University	13	-	2	9	2	-
University of Iowa	29	-	2	26	1	-
University of Minnesota	3	-	1	2	-	-
University of Wisconsin	35	-	4	28	3	-
University of Pittsburgh	26	1	6	16	3	-
Michigan State University	27	-	6	18	3	-
Indiana University	7	1	4	2	-	-
Totals	248	5	49	171	22	1

Table 12 - Participant Evaluation of Lecture Detail Level

Question: How do you feel about the level of detail in the lectures? Comments	N	Responses: Too Detailed	Detailed	Average	Gross	Too Gross
University of California	26	-	9	16	1	-
University of Southern California	10	-	5	5	-	-
Florida State University	24	-	11	10	2	1
Syracuse University	35	4	8	22	1	-
Columbia University	21	-	10	5	6	-
Washington University	11	-	2	9	-	-
University of Iowa	26	-	10	15	1	-
University of Minnesota	4	-	1	3	-	-
University of Wisconsin	36	1	10	23	1	1
University of Pittsburgh	23	3	2	14	4	-
Michigan State University	25	-	9	15	1	-
Indiana University	7	-	-	6	1	-
Totals	248	8	77	143	18	2

Table 13 - Participant Overall Rating of Lecture

Question: What would be your overall rating of the lectures and how do you think they can be improved? Please be as specific as possible.	N	Responses: Excellent	Good	Average	Fair	Poor
University of California	27	3	21	3	-	-
University of Southern California	10	5	5	-	-	-
Florida State University	23	10	13	-	-	-
Syracuse University	35	2	29	3	1	-
Columbia University	16	9	7	-	-	-
Washington University	11	3	8	-	-	-
University of Iowa	27	6	17	4	-	-
University of Minnesota	4	3	1	-	-	-
University of Wisconsin	36	19	15	1	1	-
University of Pittsburgh	23	7	16	-	-	-
Michigan State University	25	14	8	2	1	-
Indiana University	7	3	4	-	-	-
Totals	244	84	144	13	3	-

Table 14 - Participant Recommendation on Session Elimination

Question: If the lectures were to be shortened by one session, which session would you suggest omitting?	N	Responses: First	Second	Third	Fourth
University of California	23	-	-	5	18
University of Southern California	6	-	-	2	4
Florida State University	17	-	1	6	10
Syracuse University	28	1	-	10	17
Columbia University	11	-	2	5	4
Washington University	8	1	2	4	1
University of Iowa	17	1	-	11	5
University of Minnesota	2	-	-	1	1
University of Wisconsin	17	1	3	3	10
University of Pittsburgh	18	1	2	8	7
Michigan State University	15	1	1	6	7
Indiana University	5	-	-	2	3
Totals	167	6	11	63	87

Table 15 - Participant Recommendation Regarding PERT/COST

Question		Responses	
Would you be interested in lengthening the lecture so PERT/COST could be considered in more details?	N	Yes	No
University of California	25	12	13
University of Southern California	9	1	8
Florida State University	20	12	8
Syracuse University	32	9	23
Columbia University	14	9	5
Washington University	10	4	6
University of Iowa	20	7	13
University of Minnesota	4	2	2
University of Wisconsin	27	18	9
University of Pittsburgh	21	12	9
Michigan State University	21	10	11
Indiana University	7	5	2
Totals	210	101	109

Table 16 - Participant Evaluation of Most Informative Session

Question: Which session did you consider to be the most informative?	N	Responses: First	Second	Third	Fourth
University of California	26	14	6	6	-
University of Southern California	10	4	3	3	-
Florida State University	22	12	8	-	2
Syracuse University	37	18	16	3	-
Columbia University	15	6	4	3	2
Washington University	12	6	5	1	-
University of Iowa	26	10	11	5	-
University of Minnesota	5	-	1	4	-
University of Wisconsin	34	13	11	9	1
University Pittsburgh	25	9	13	3	-
Michigan State University	27	14	12	-	1
Indiana University	6	-	4	1	1
Totals	245	106	94	38	7

Table 17 - Participant Evaluation of Instructors

Question: How would you evaluate the instructors with respect to their presentation, knowledge of the subject and their ability to explain and clarify points?	N	Responses: Excellent	Good	Average	Fair	Poor
University of California	26	13	12	1	-	-
University of Southern California	10	7	3	-	-	-
Florida State University	24	16	8	-	-	-
Syracuse University	35	12	20	3	-	-
Columbia University	16	10	6	-	-	-
Washington University	11	2	9	-	-	-
University of Iowa	27	17	9	1	-	-
University of Minnesota	4	4	-	-	-	-
University of Wisconsin	37	29	7	-	1	-
University of Pittsburgh	26	13	12	-	1	-
Michigan State University	26	16	9	1	-	-
Indiana University	7	4	3	-	-	-
Totals	249	143	98	6	2	-